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A DISCUSSION OF THE GAP BETWEEN KNOWLEDGE AND USE OF NEW PRACTICES.

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A STUDY ON FARMERS' USE OF SUGGESTED PRACTICES IN HANDLING ALFALFA CROP PRODUCTION WAS CONDUCTED TO DETERMINE (1) IF SELECTED PERSONAL AND OCCUPATIONAL CHARACTERISTICS MIGHT AFFECT HAY PRODUCTION METHODS, (2) IF A DISCREPANCY EXISTS BETWEEN THE FARMER'S LEVEL OF KNOWLEDGE OF QUALITY HAY PRODUCTION PRACTICES AND HIS USE OF THESE PRACTICES, AND (3) IF THIS DISCREPANCY EXISTS, IN WHAT AREAS. TWO SAMPLE GROUPS WERE USED. FOR ONE, KNOWLEDGE OF QUALITY HAY PRODUCTION PRACTICES WAS DETERMINED, AND FOR THE OTHER, THE USE OF THESE PRACTICES. THE GROUPS WERE MATCHED ON PERSONAL AND OCCUPATIONAL CHARACTERISTICS. A MAILED QUESTIONNAIRE WAS DEVELOPED FOR EACH GROUP. STATISTICAL ANALYSIS SHOWED SIGNIFICANT DIFFERENCES BETWEEN THE KNOWLEDGE OF, AND THE USE OF, MOST FACTORS AND PRACTICES. POSSIBLE EXPLANATIONS FOR THE DIFFERENCES ARE DISCUSSED. THE STUDY SHOWED THAT AN INCREASE IN AGE REDUCED DIFFERENCES BETWEEN KNOWLEDGE AND USE FOR SOME PRACTICES, INCREASED THEM FOR OTHERS, AND HAD NO EFFECT ON THE REMAINDER. EDUCATION, OCCUPATIONAL RATING, AND SIZE OF OPERATION WERE POSITIVELY RELATED TO DIFFERENCES BETWEEN KNOWLEDGE AND USE. THE BIBLIOGRAPHY INCLUDES 53 REFERENCES. (JA)

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BACKGROUND TO THE STUDY

Although the national alfalfa hay crop has an estimated annual dollar and cents value in this country of 1.5 billion dollars, the quality of this alfalfa hay crop varies more than any other major U.S. farm crop. The large amount of variation in quality is in some degree a result of farmers not engaging in quality hay production practices. Thus, a project has been designed and applied to determine why these individuals are not engaged in the acceptable and suggested practices for the handling of this crop. Investigation of this problem has been directed toward determining (1) if selected personal and occupational characteristics of farmers might affect their hay production methods; (2) if a discrepancy exists between the farmer's level of knowledge of quality hay production practices and his use of these practices; and (3) if this discrepancy exists, in what areas? Answers to these questions could (1) lead to an increase in the production of quality of alfalfa hay and (2) enhance the future value of this crop. Also, contributions by educators and other sources of information could perhaps be more readily put into effect.

Traditionally, research on alfalfa hay has centered around determining characteristics and definitions of quality alfalfa hay and on determining the correct practices for economically achieving quality alfalfa hay. Many reports (1-12) have indicated the findings of this research. These studies have not included human factors, i.e., (1) knowledge farmers have of the characteristics of and production practices for quality alfalfa hay and (2) the practices that farmers, even if they know better, carry out in production of this crop.

Studies have been conducted on the difference between knowledge of approved practices and use of these practices in such fields as corn production (13), beef production (14), vegetable production (15, 16), broiler production (17),

dairy production (18), various areas of education (19, 20), as well as many studies about general farming practices, but these studies have traditionally compared the knowledge and use of practices within the same sample.

Studies have shown that selected variables such as age (13, 15, 17, 18, 21-29), educational level (14-17, 22-23, 26-27, 29, 32-40), farm occupational rating (22-23, 30-31, 35), and size of unit (14-18, 32-38, 40-46) have varying effects upon the adoption of approved practices. However, these studies have not dealt with the effect these factors have on the difference between knowledge and use of these practices.

The present research project has combined the objectives of the above stated programs in that it has centered on the difference between the knowledge of quality alfalfa hay practices of one sample and the use of these practices by another sample having the same personal and occupational characteristics. An attempt was made to determine selected personal and occupational characteristics of farmers which might affect their hay production methods. Two separate groups have been used (one group for knowledge of quality hay production practices and one group for use of these practices) to reduce the probability that participants would accurately state the practices they used but in reality would not use them.

If a significant difference between farmers' knowledge of quality alfalfa hay production practices and their use of these practices was found, it would indicate a need for additional research to determine (1) specific differences in particular practices and (2) what could be done to bring about an increase in the use of quality alfalfa hay production practices so that the use would compete with knowledge.

Objectives

1. Will there be a significant difference between the knowledge a person has of correct usage and the methods he actually practices?

2. Will selected variables (such as age, educational level, farm occupational rating and size of unit) have an effect on the differences which may occur between knowledge and practices?

Definition of Terms

Knowledge group -- That group in the survey which completed the knowledge questionnaire which contained questions pertaining to the knowledge the participants had of quality alfalfa hay production practices.

Practice group -- That group in the survey which completed the practices questionnaire which contained questions pertaining to the practices the participants used in alfalfa hay production.

Farm occupational rating -- Whether farmer owned or rented farming unit.

Size of unit -- Total acres operated by the respondent; includes both owned and rented acres.

DEVELOPMENT OF TESTING INSTRUMENT

Material for the questionnaire used in this study was based on "What constitutes quality hay production?" as stated in Nelson's thesis (1) and in a Special Report by the Agricultural Research Service (2). Information was also gathered on demographic and general farming characteristics.

A pilot study was made in Saunders County. Post cards were sent to all farmers whose names appeared on a commercially published county mailing list. These post cards asked for such information as size of farm, acres of alfalfa and how hay was handled.

Research Procedure

The full-scale program followed the design of the pilot program with minor changes in procedure, questionnaires and transmittal material. Antelope, Buffalo, Dundy, Franklin, Morrill and Saline counties were selected as the experimental area for the research program because these areas were believed to be indicative of different soil, climatic and other farming conditions. The scope of this study was limited to only those farmers who presently grow alfalfa hay and package hay in square bales. Those post cards which were returned and whose information fitted into the scope of the study were divided into two equal groups by placing the names alphabetically and dividing them by two's. These two groups made use of two questionnaires--one directed towards knowledge and the other towards practices--in order to reduce the possibility that participants would accurately state the practices they used and state that they knew no more, but in reality would know a great deal more; or they would correctly state their knowledge of quality alfalfa hay production practices and indicate that they used these practices but were not actually doing so.

Letters were enclosed with these questionnaires explaining their purpose. The letters for the two types of questionnaires were identical with the exception of the final statement. This final statement indicated that the questionnaire was concerned with knowledge (in the case of the knowledge questionnaire) or use (in the case of the practice questionnaire) of quality hay production practices. These letters of transmittal carried the county agent's signature and the post cards and questionnaires were to be returned to his office.

The questionnaired were pre-coded from the post cards into the correct classification of how many acres of alfalfa were square baled. All other questions were post-coded according to a list of instructions for coding. The coded data were then key punched on cards to be used in analysis by a computer.

Analysis of Data

A statistical analysis employing a variation of the chi-square was employed to determine whether the knowledge group and the practices group had the same general characteristics (such as age, educational level, size of unit, farm occupational rating, source of information, etc.). The same type of analysis was also conducted to determine whether a significant difference existed between what the knowledge group knew about quality alfalfa hay production and the use the practice group made of these production practices.

A Kolmogorov-Smirnov computed chi-square test was conducted to determine whether there was a significant difference between the knowledge group and the practice group on the questions concerning (1) crimping or crushing alfalfa hay and (2) artificial drying of alfalfa hay. This particular statistical test was computed for these questions because there was not a sufficiently large enough number to ensure the validity of the chi-square test.

DISCUSSION

In regard to knowledge and use we found that a significant difference did exist between the knowledge of and the use of most factors and practices. The only exceptions were the knowledge and use of the factors 'color of hay' and 'leafiness of hay'. These results corroborate findings by Ryan and Gross (36), Copp (14), Lionberger (49), Sizer and Porter (38), Baker (21) and others.

There are various reasons which could account for this difference. The farmer's financial condition may be such that he is not in a position to purchase additional material or equipment; i.e., (1) machinery to crimp or crush alfalfa hay, (2) chemicals and equipment with which to apply them for good weed and pest control, (3) fertilizer and the equipment with which to apply it, and (4) equipment and perhaps land leveling for wise water management. Differences in the two groups regarding such things as best stage cut, windrow moisture and bale moisture may be due to the farmer's occupation with some other activity and he may not be able to perform each practice at the most appropriate time. To co-ordinate these practices farmers may have to hire additional help or equipment (which they may not be in a position to do). In addition, lack of time or equipment to make a chemical analysis, to make use of the USDA grading system and to check energy content or vitamin A content could account for the significant difference between knowledge and use of these factors. Health and age are also reasons for not adopting certain practices.

A number of individuals have offered reasons to explain this difference between knowledge and use of approved practices. "Many times when an idea is advanced, it is objected to because it is an idea and, therefore, must be impractical..." (Kelley & Rasey; 48, p. 165). "Systems of ideas composed of rationalizations of various types, beliefs, superstitions, prejudices, grudges or habits developed in the course of the years often become so firmly established that they can scarcely be dislodged even in the face of substantial evidence that they are irrational, useless, or even vicious..." (Gates, et al; 47, p. 671). "The reasons why farmers adopt farm practices more quickly at one time than another relate to the situation in which they find themselves when alternate courses of action become known..." (Baker; 21, p. 100-101).

The selected variables of age, educational level, farm occupational rating and size of unit had varying effects upon the difference between knowledge and use of alfalfa hay production factors and practices. In regard to 'age' and the use of new practices, some studies (17, 21, 23-27, 29-30) have reported a negative relation between age and adoption of approved practices; Klietsch (18) reported a positive relationship; and Copp (14) and Rogers (15) found that age had no significant effect on innovativeness. The present study found that an increase in age has for some practices reduced differences between knowledge and use; for others has increased the differences; and for others has had no effect. An increase in the difference between the two groups may have resulted from the fact that: (1) knowledge increased but practice did not increase proportionally; or (2) practice decreased at a greater rate than knowledge. The decrease in the difference may have resulted from: (1) practice increased proportionally more than knowledge; (2) knowledge decreased but practice decreased proportionally less or remained the same; (3) knowledge remained the same but use for some reason increased. No change in the difference may have resulted from proportionate changes or no changes in knowledge and practice. Further research is necessary to determine if the changes were mostly in the area of knowledge or in the use of these practices.

In regard to education and adoption of new practices, many previous studies (14-17, 21-23, 32-39, 51-52) found a positive relation between education and adoption. However, Meaders (13) found no relation and Lionberger and Coughenour (35) and Hoffer (53) found that the correlation between years of schooling completed and adoption levels is materially lowered when age and income are held constant. The present study has indicated that for most practices, the difference between knowledge and use has been decreased significantly when the various effects of education are not considered.

In regard to occupational rating, Wilkening (22), Copp, Sill and Brown (23), Wilson and Gallup (30), Lionberger and Coughenour (35); Lionberger (31), and a Kentucky Agricultural Experiment Station Mimeo (50) indicated that farm occupational rating is positively associated with adoption rates (i.e., adoption rates were higher for farm owners than for those who rent their farms). Analysis of the data for this study has shown that for nearly every practice difference between knowledge and use has been decreased when lower farm occupational rating groups were not considered.

In regard to size of operation, various studies (14-18, 32-41, 43, 46) reported a positive relationship between size of operation and innovativeness. However, two studies (Fliegel, 42 and Beal and Rogers, 45) reported that size of operation had no significant effect upon the adoption process.

Analysis of the data for the present project indicated that the difference between knowledge and use was for the most part higher when the group of respondents including those who operated 260-499 acres (in some cases this also included respondents operating fewer acres) were not considered.

Summary:

The major aims of this study have been to determine if there was a significant difference between knowledge and use of alfalfa hay production factors and practices and if certain variables would have an effect on any differences that did exist. Objectives were stated regarding the aims of the study. A significant difference between knowledge and use was found to exist and certain selected variables were found to have varying effects on the differences found between knowledge and use. Discussion of the results was presented and suggestions for further research were made. The results obtained indicated that a gap exists between the knowledge of factors and practices of alfalfa hay production and the use of these factors and practices in producing alfalfa hay.

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